What is claimed:

1. A digital x-ray imaging device comprising:

a top electrode layer;

a dielectric layer under the top electrode layer;

a sensor layer under the dielectric layer, comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge-collecting electrode;

a thin film transistor readout matrix connected to the charge-collecting electrodes; and

a variable power supply adapted to provide a range of voltages between the top electrode layer and the readout matrix.

2. The digital x-ray imaging device of claim 1 wherein the variable power supply comprises a programmable power supply.

3. The digital x-ray imaging device of claim 1 wherein the photoconductive layer comprises an element selected from the group consisting of: selenium, lead iodide, thallium bromide, indium iodide, and cadmium telluride.

4. The digital x-ray imaging device of claim 3 wherein the photoconductive layer is about 100 to about 1000 microns thick.

5. The digital x-ray imaging device of claim 4 wherein the photoconductive layer comprises a layer of selenium about 500 microns thick.

6. The digital x-ray imaging device of claim 1 wherein the power supply is adapted to provide a range of voltages with at least approximately a 2:1 turndown ratio.

7. The digital x-ray imaging device of claim 5 wherein the power supply is adapted to provide a range of voltages between about 1.5 kV and about 3.0 kV.

8. In a digital x-ray imaging device having a top electrode layer and a readout matrix, the improvement comprising a variable power supply adapted to provide a range of voltages between the top electrode layer and the readout matrix.

9. A method for providing a broad dynamic range for a digital x-ray imaging device comprising a top electrode layer; a dielectric layer; a sensor layer comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge-collecting electrode; a thin film transistor readout matrix connected to the charge-collecting electrodes; and a power supply for supplying a voltage between the top electrode layer and the readout matrix; the method comprising varying the voltage between the top electrode layer and the readout matrix to provide an acceptable signal-to-noise ratio over a greater range of exposures than provided at a single voltage.

10. The method of claim 9 further comprising using the method for non-destructive testing of one or more objects.

11. The method of claim 10 further comprising performing the non-destructive testing on an object selected from the group consisting of: a printed circuit board, a wax casting, a metal casting, a turbine blade, and a rocket cone.

12. The method of claim 9 comprising varying the voltage in a range between about 1.5 kV and about 3.0 kV.

13. The method of claim 9 comprising using the digital imagaging x-ray device with a range of x-ray energies from about 10 KeV to about 10 MeV.

14. 10 The method of claim 9 comprising providing a signal-to-noise ratio of at least about 50.

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